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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/651,334	08/31/2000	Mark J. Bailey	ROC9-2000-0158-IBM-191	3888

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EXAMINER
ALCALA, JOSE H

ART UNIT	PAPER NUMBER
2827	

DATE MAILED: 08/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/651,334	BAILEY ET AL.	
	Examiner	Art Unit	
	Jose H Alcala	2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 April 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) *4 and 22* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-21 and 23-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-3,5-12,20-21,23-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1,20 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: where exactly is the conductive pad located in relation to the hole, to the insulating layer and to the conducting layer. It is essential to the invention that the structural relationship of the conductive pad with the rest of the elements of the device be clear, in order to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1,6-8,23-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Meyer et al. (US Patent No. 5,089,880). As best understood by the examiner:

Regarding claim 1, Meyer teaches a surface laminar circuit board, comprising: an insulating layer (bottom reference number 72); a conductive layer (Reference number 70) disposed on an upper surface of said insulating layer, said conductive layer having a hole formed therein (the hole of via Reference number 38); a dielectric layer disposed on an upper surface of the conductive layer (top reference number 72); and a conductive pad (reference number 40) having over 50% thereof within an area defined by an outer periphery of the hole.

The limitation: "said conductive pad being for receiving a surface mounted component thereon", is an intended use limitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex Parte Masham, 2 USPQ F.2d 1647 (1987).

Regarding Claim 6, Meyer teaches that said conductive layer (reference number 70) comprises a ground layer.

Regarding Claim 7, McMahon teaches that said ground layer is comprised of copper (column 8, line 11).

Regarding claim 8, the limitation that the hole is formed by etching is a product by process limitation. If the product in the product-by-process claims are the same as or obvious from a product of the prior art, the claims are unpatentable even tough the prior

product was made by a different process. See In re Thorpe, 227 USPQ 964,966 (Fed.Cir 1985). A "product by process" claim is directed to the product per se, no matter how actually made, In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); In re Marosi et al, 218 USPQ 289; and particularly In re Thorpe, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear.

Regarding Claim 23, Meyer teaches a surface laminar circuit board, comprising: an insulating layer (bottom reference number 72); a sheet of conductive material (Reference number 70) disposed on an upper surface of said insulating layer, said sheet of conductive material having a hole (the hole for via Reference number 38) formed therein; the hole exposing a portion of said insulating layer, the sheet of conductive material completely surrounding an area defined by the hole, the area being in registration with, and corresponding in shape and size, to the portion of said insulating layer exposed by the hole (see Figure 4); a dielectric layer (top reference number 72) disposed on an upper surface of said conductive material; and a conductive pad (Reference number 40) having a major portion thereof disposed directly over the portion of said insulating layer exposed by the hole.

The limitation: "said conductive pad being for receiving a surface mounted component thereon", is an intended use limitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex Parte Masham, 2 USPQ F.2d 1647 (1987).

Regarding claim 24, Meyer teaches that said dielectric layer is in direct contact with the portion of said insulating layer exposed by the hole (see figure 4), and wherein said conductive pad is disposed in direct contact with an upper surface of said dielectric layer, said dielectric layer separating said conductive pad from said conductive material and from said insulating layer.

Regarding claim 25, Meyer teaches that said conductive material (reference number 70) comprises a ground layer.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 2-3,9-11,20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable Meyer et al. (US Patent No. 5,089,880) in view of Trask et al. (US Patent No. 5,034,091). As best understood by the examiner:

Regarding Claim 2, Meyer teaches all the limitations of the instant claimed invention as stated supra for claim 1, but fails to explicitly teach said dielectric layer is a photosensitive dielectric layer. Trask teaches a circuit board having a photosensitive dielectric layer (reference number 8). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of McMahon and in order to have a photosensitive dielectric layer, thus providing a stable and easy to accommodate base for a metal coated via, and making the circuit board easily adaptable to vertical stacking in order to save space and improve integration.

Regarding Claim 3, Meyer as modified by Trask teaches that said photosensitive dielectric layer is in direct contact with the insulating layer by way of the hole, and that said conductive pad is disposed directly on an upper surface of said photosensitive dielectric layer (See figure 4 of Meyer), and that the dielectric layer is separating said conductive pad from said conductive layer and from said insulating layer.

Regarding Claim 9, Meyer as modified by Trask teaches that said photosensitive dielectric layer has a thickness (it is inherent to the device), in a region over the conductive layer, but fails to explicitly teach that the thickness is less than about 50 micrometers. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the thickness less than about 50 micrometers in order to improve integration and reduce the use of material. In addition since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. See In re Aller, 105 USPQ 233.

Regarding Claim 10, Meyer as modified by Trask teaches that said photosensitive dielectric layer has a thickness, (it is inherent to the device), in a region over the conductive layer, but fail to explicitly teach that the thickness is equal to or less than about 40 micrometers. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the thickness equal to or less than about 40 micrometers in order to improve integration and reduce the use of material, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding claim 11, Meyer as modified by Trask teaches signal traces (reference number 260) disposed directly on said photosensitive dielectric layer.

Regarding Claim 20, Meyer teaches a surface laminar circuit board, comprising: an insulating layer (bottom reference number 72); a signal ground conductive layer (Reference number 70); disposed on an upper surface of said insulating layer, said conductive layer having a hole (the hole for via reference number 38) formed therein; a dielectric layer (top reference number 72) disposed on an upper surface of the signal ground conductive layer, said dielectric layer having a micro via (reference 38) formed therein; a signal trace (reference number 50) disposed on said photosensitive dielectric layer, and being electrically coupled with said signal ground conductive layer by way of said micro-via (See figure 4); a conductive pad (Reference number 40) having over 50% thereof within an area defined by an outer periphery of the hole, and being electrically coupled with said signal trace; and a surface mounted component (reference number

10) mounted on said conductive pad. McMahon fails to explicitly teach that the dielectric layer is photosensitive and that the micro-via is a photo micro-via.

Trask teaches a circuit board having a photosensitive dielectric layer (reference number 8) and having a photo micro-via (reference number 26). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Meyer and in order to have a photosensitive dielectric layer, thus providing a stable and easy to accommodate base for a metal coated via, and making the circuit board easily adaptable to vertical stacking in order to save space and improve integration.

Regarding claim 21, Meyer as modified by Trask teaches that said photosensitive dielectric layer is in direct contact with the insulating layer by way of the hole (see arrangement of Meyer in figure 4), and wherein said conductive pad is disposed directly on an upper surface of said photosensitive dielectric layer (See Meyer figure 4) separating said conductive pad from said conductive layer and from said insulating layer.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meyer et al. (US Patent No. 5,089,880) in view of Trask et al. (US Patent No. 5,034,091), and further in view of Higgins, Jr. (US Patent No. 5,034,091). As best understood by the examiner:

Regarding Claim 5, Meyer as modified by Trask teaches all the limitations of the instant claimed invention as stated supra for claim 1, but fails to explicitly teach that said

insulating layer is an FR4 insulating layer. Higgins, Jr. teaches a dielectric layer made of an FR4 material. It would have been obvious to one having ordinary skill in the art at the time the invention was made, to make said insulating layer an FR4 insulating layer, in order to attenuate any unwanted radio frequency signals. In addition it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

8. Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meyer et al. (US Patent No. 5,089,880). As best understood by the examiner:

Regarding Claim 26, Meyer teaches that said dielectric layer has a thickness (it is inherent to the device), in a region over the conductive layer, but fails to explicitly teach that the thickness is less than about 50 micrometers. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the thickness less than about 50 micrometers in order to improve integration and reduce the use of material. In addition since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. See In re Aller, 105 USPQ 233.

Regarding Claim 27, Meyer teaches that said dielectric layer has a thickness, (it is inherent to the device), in a region over the conductive layer, but fail to explicitly teach that the thickness is equal to or less than about 40 micrometers. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the

thickness equal to or less than about 40 micrometers in order to improve integration and reduce the use of material, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

9. Claims 12,28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meyer et al. (US Patent No. 5,089,880) in view of Arisaka (US Patent No. 5,102,352). As best understood by the examiner:

Regarding Claim 12, McMahon teaches all the limitations of the instant claimed invention as stated supra for claim 1, but fails to explicitly teach that said conductive pad is disposed completely within the area defined by the outer periphery of the hole.

Arisaka teaches a conductive pad (top of reference number 21) disposed completely within the area defined by the outer periphery of the hole (reference number 20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Meyer and Arisaka in order to have a conductive pad completely within the area defined by the outer periphery of the hole, thus reducing the impedance between ground layers and affording impedance matching of signal layers.

Regarding Claim 28, McMahon teaches all the limitations of the instant claimed invention as stated supra for claim 25, but fails to explicitly teach that all of said conductive pad is disposed over the portion of said insulating layer exposed by the hole.

Arisaka teaches a conductive pad (top of reference number 21) disposed over the portion of said insulating layer exposed by the hole (reference number 20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Meyer and Arisaka in order to have a conductive pad disposed over the portion of said insulating layer exposed by the hole, thus reducing the impedance between ground layers and affording impedance matching of signal layers.

Regarding Claim 29, McMahon teaches all the limitations of the instant claimed invention as stated supra for claim 23, but fails to explicitly teach that all of said conductive pad is disposed over the portion of said insulating layer exposed by the hole.

Arisaka teaches a conductive pad (top of reference number 21) disposed over the portion of said insulating layer exposed by the hole (reference number 20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Meyer and Arisaka in order to have a conductive pad disposed over the portion of said insulating layer exposed by the hole, thus reducing the impedance between ground layers and affording impedance matching of signal layers.

Response to Arguments

10. Applicant's arguments filed 7/25/02 with respect to the 35 USC §112 rejection, have been fully considered but they are not persuasive. Applicant argues that the no further recitation regarding the positional relationships of the conductive pad is necessary. Examiner respectfully disagrees and points out that the claim is omitting subject matter, which is essential to the invention. It is clear to the examiner that

breadth of the claim is not equated with indefiniteness, but the structure of the device as claimed is incomplete and therefore rejected . The rejection is still proper.

11. Applicant's arguments, see page 11, lines 1-11 , filed 4/19/03, with respect to the rejection(s)of claim(s) 1,20 under McMahon have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Meyer et al. (US Patent No. 5,089,880).

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references show some of the elements of the instant claimed invention: Kuwabura et al. (US Patent No. 4,675,789), Rouge (US Patent No. 4,524,239), Schmidt et al. (US Patent No. 5,436,062), Marshall et al. (US Patent No. 5,067,004), Schumacher et al. (US Patent No. 5,381,306) and Carey (US Patent No. 5,272,600).

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jose H Alcala whose telephone number is (703) 305-9844. The examiner can normally be reached on Monday to Friday.

14. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 305-3431 for After Final communications.

15. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JHA
July 28, 2003

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